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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,419	12/11/2003	John T. Moore	MI22-2463	4614
21567	7590	09/08/2005		
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201				
			EXAMINER WARREN, MATTHEW E	
			ART UNIT 2815	PAPER NUMBER

DATE MAILED: 09/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/734,419

Applicant(s)

MOORE ET AL.

Examiner

Matthew E. Warren

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 34,36-38 and 40-47 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) 38 and 40-47 is/are allowed.
- 6) ☒ Claim(s) 34,36 and 37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>5/19/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is in response to the Amendment and the Terminal Disclaimer filed on May 19, 2005.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 34, 36, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Prior Art Figure 2 (APAF) in view of Nagaoka (JP 09-55351 A).

In re claim 34, the APAF 2 shows a semiconductor wafer assembly comprising a silicon oxide material (14) having a surface, a silicon nitride material comprising Si_3N_4 and having a surface, the silicon nitride material being over and physically contacting the surface of the silicon oxide; a barrier layer (18) over and physically contacting the surface of the silicon nitride material, the barrier comprising an antireflective coating of a polymer material; and a photoresist (20) over and physically against the barrier layer. The APAF 2 shows all of the elements of the claims except the barrier layer comprising silicon, oxygen, and nitrogen. Nagaoka discloses (abstract and fig. 2d) a semiconductor device comprising antireflection film (26) of SiON formed on the substrate or other layers and a photoresist (30) formed subsequently on the SiON layer. With this

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configuration a good pattern can be formed. The reference do not specifically disclose that the thickness of the nitride is greater than 1% of a combined thickness of the silicon nitride material and the barrier layer, however such a limitation is so broad that just about any thickness of nitride will meet that limitation. The APAF 2 has a nitride thickness of about 100 to 200 nanometers such that when it is combined with the SiON layer of Nagaoka, it will be greater than 1% of a combined thickness of the nitride material and SiON. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the antireflection film of the APAF by using SiON instead as taught by Nagaoka to form a semiconductor device having a good pattern.

In re claims 36 and 37, concerning the specific composition of the SiNO and the thickness of the barrier layer, It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the device SiNO having the desired ration or thickness, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Allowable Subject Matter

Claims 38, and 40-47 are allowed.

The following is an examiner's statement of reasons for allowance: with respect to independent claim 38, the prior art references, alone or in combination, do not show a semiconductor wafer comprising: a composite layer over and contacting a silicon oxide

layer, the composite layer having a thickness, a first portion of the thickness comprising a first ratio of silicon to nitrogen and a second portion of the thickness having a second ratio of silicon to nitrogen which is greater than the first ratio. With respect to independent claim 45, the prior art also does not show a composite layer over and contacting a silicon oxide layer, the composite layer having a thickness, a first portion of the thickness comprising a first silicon nitride material having a first refractive index and a second portion of the thickness comprising a second silicon nitride material having a second refractive index which is greater than the first refractive index, and a photoresist over the composite layer.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

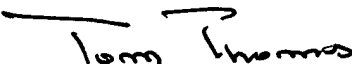
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Warren whose telephone number is (571) 272-1737. The examiner can normally be reached on Mon-Thur and alternating Fri 9:00-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MEW
MEW
September 2, 2005


TOM THOMAS
SUPERVISORY PATENT EXAMINER